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AUTHOR Kerka, Sandra
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ABSTRACT

Interactive videodisc (IVD) offers a combination of media with practical applications in vocational education. IVD is superior to videotapes and other media in quality, applicability, and effectiveness. IVD can be used in different settings and for a variety of instructional applications. Although not appropriate for every learning situation, IVD has strengths, including student control of the interaction, instant feedback, and a two-way dialogue that engages the learner mentally and physically. Vocational educators have applied IVD in various ways: to teach employability skills; to provide remedial instruction for technical students with low math skills; to provide training in safety, security, and quality standards through simulation of workplace problems; and to provide tutorial and simulation of the use of a welding torch. Key factors in using IVD in vocational education are related to instructional design, teacher role, and costs. A basic question is whether IVD is the appropriate medium for the subject or situation. IVD, a highly learner-centered medium, definitely changes the role of the teacher, who acts more as a resource person or facilitator. Although cost seems to be a barrier, most equipment is modular and additions can be made over time. (11 references) (YLB)

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Clearinghouse on Adult, Career, and Vocational Education

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# INTERACTIVE VIDEODISC IN VOCATIONAL EDUCATION

As new technologies transform the workplace, workers must have the ability to cope with change, take responsibility for their learning, think critically to solve problems, and work cooperatively in a team environment. Instructional technology can prepare students to meet these workplace challenges while keeping them motivated and interested. In the past, some instructional media failed to fulfil their promise. However, interactive videodisc offers a combination of media--computers, video, audio, and graphics--which has greater potential to--

- Increase opportunities for individuation, diagnosis, and self-pacing
- Give access to a wide variety of information resources
- Bring resources to isolated or limited-mobility populations
- Stretch instructors' capabilities to reach more students
- Accommodate different learning styles
- Provide better ways to measure skills than standardized testing

Expanding on an earlier ERIC Digest (Kerka 1986), this publication looks at practical applications of interactive videodisc (IVD) in vocational education.

## The ABCs of IVD

Proclaimed "the hot new teaching tool of the nineties" ("Interactive Laser Disc" 1990, p. 5), videodisc systems can be simply a disc player and monitor for play back, or they can include a microcomputer to allow the user to interact with the program. (For more detailed descriptions, see Johnson 1987.) Compared to videotapes and other media, interactive videodiscs provide enhanced picture and sound quality; extended longevity of both the discs and the players; faster, random access to individual frames; high quality freeze-frames; huge storage capacity; and connectivity to other devices.

Interactive video can instill confidence and enthusiasm, reinforce self-directed mastery learning, make instructional management easier, and motivate special needs and at-risk students (De Zonia 1990; Johnson 1987). The multisensory mixture of video, text, sound, and graphics increases learner interest, attention, and retention. The visual and auditory cues engage different learning modalities. Branching enables a closer match with individual learning styles and speeds. Student progress through lessons can be monitored.

IVD can be used in different settings. Individual use offers the most scheduling flexibility and self-pacing. In a group situation, video is projected on a large-screen monitor and viewing can be stopped to allow discussion and debate. A cooperative setting with two learners provides opportunities for teamwork and collaboration. Among the instructional applications are video glossaries that replace slides; simulations and demonstrations; desktop publishing of curriculum materials; individual and group testing with computerized grading and recordkeeping; student projects such as video term papers; and video encyclopedias. With bar codes incorporated in textbooks, video segments related to the text can be conjured up with an optical scanner.

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## Effects on Learning

Studies of the effectiveness of interactive video have compared it both to traditional methods and to other types of instructional technology. Nursing students who used a videodisc on patient assessment independently showed no significant differences in cognitive achievement in comparison with a group who received lectures (Soled et al. 1989). However, the IVD group had significantly increased positive attitudes toward learning and more time for individual work with instructors. Another study (Bosco and Wagner 1988) used both videotape and IVD for safety instruction of auto workers. Higher achievement, fewer errors, and more favorable attitudes were found among the laserdisc users.

Three groups of junior high industrial arts students were taught shop safety rules in these formats: videotape only, computer-assisted tutorial, and interactive video (Dalton and Hannafin 1986). Although the tutorial was somewhat more effective for this type of task, interactive video significantly improved attitudes. At Miami-Dade Community College, students using supplemental interactive video and/or computer-assisted tutorial scored higher on an academic skills test than those given lecture and textbook instruction (Bailey 1990).

Although not appropriate for every learning situation, IVD clearly has strengths that justify its use. Student control of the interaction gives them ownership of the success and consequences of their actions. "Feedback is instant, realistic, nonthreatening, and helpful" (Johnson 1987, p. 37). Well-designed interactive video creates a two-way dialogue that engages the learner mentally and physically.

## Uses in Vocational Education

Vocational educators have applied IVD in various ways:

- Harrison School District in Colorado Springs created an employability skills videodisc that has four modules: dependability, responsibility, human relations, and teamwork. It dramatizes on-the-job situations, allows students to choose solutions, and illustrates the consequences of the choices (De Zonia 1990).
- In Wisconsin, Interactive ModuMath provides remedial instruction for technical students with low math skills without holding back more able students (ibid.). Typical lessons include presentation of theory, drill and practice, word problems with remedial branching, and review and posttesting. With the recordkeeping and authoring system, the "live" instructor can monitor student interaction with the video tutor and make alterations.
- Westinghouse provides training in safety, security, and quality standards through videodisc simulation of workplace problems--a practical way to give real-world experience without the dangers that wrong safety choices would entail (Gardner 1989). "The Total Quality Approach to Job Performance" also seeks to affect work ethic and attitude.

- The Academy of Aeronautics Welding Simulator includes an extensive tutorial and a realistic simulation that puts a video welding torch in students' hands (Johnson 1987). A three-dimensional touch screen becomes a welding environment that responds to the position and movement of the torch.

## Issues in Using Videodiscs

Key factors in using IVD in vocational education are related to instructional design, the role of the teacher, and costs.

### Instructional Issues

A basic question is whether IVD is the appropriate medium for the subject or the situation. Demonstration and hands-on practice are traditional vocational education techniques that videodiscs do very well, but there are other instructional situations in which another medium might be better. Consider the following questions: Does the subject lend itself to video? Is learner motivation a concern? Does video promote better learner engagement? (Rodriguez 1988).

Are existing packages appropriate? The catalog of commercial educational videodiscs grows larger every day, but editing and adaptation are difficult and production can be time consuming and costly. However, systems are becoming available that permit educators to create, store, and update their own courseware; Apple's HyperCard is one example ("Interactive Laser Disc" 1990). Another strategy is "repurposing" existing films or videotapes by transferring them to disks and combining them with a branching and interactivity package (Johnson 1987).

A concern expressed in initial studies of IVD's effectiveness is the extent to which the novelty of the medium accounts for improved attitudes and motivation. Because video is similar to television, it has the advantage of familiarity; whether this transfers to learning is the question. Another factor is the effect of previous experience (or lack of experience) with technology on students' ability to benefit from the medium and their interest in using it.

### Teacher Role

Technology definitely changes the role of the teacher. IVD is a highly learner-centered medium, and the teacher acts more as a resource person or facilitator, meeting such learner needs as continued contact with peers, increased guidance and feedback, and opportunities to apply newly acquired skills. Teachers may have less flexibility in instructional choices in order to accommodate the medium's characteristics, but they have more time to give individual attention, answer questions, and stimulate creativity. Teachers will need more training in the effective use of the medium and stronger instructional management skills.

### Costs

Although cost seems to be a barrier to IVD use, most equipment is modular and additions such as image processors and authoring systems can be made over time. Van Horn (1987) asserts that videodiscs last longer than other media and in the long run are cheaper than film and videotapes. (Players range in price from $250 to $1,500 and discs average $30.) Production costs can also be high, although Johnson (1987) stresses that IVD is not significantly more expensive to produce than other well-designed instructional systems. "Interactive video and traditional instruction are different means to different ends" (p. 39) and a different frame of reference should be used in analyzing the costs and benefits of IVD.

Van Horn (1987) urges educators not to be deterred by the supposed barriers of novelty, cost, and lack of availability of videodiscs. More than 750 educational titles have been issued, according to the *Videodisc Compendium for Education and Training* (Emerging Technology Consultants, 2819 Hamline Avenue, North, St. Paul, MN 55113). Other resources for information on purchasing and production are given in De Zonia (1990), "Interactive Laser Disc" (1990), Rodriguez (1988), and Van Horn (1987).

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CENTER ON EDUCATION AND TRAINING FOR EMPLOYMENT
THE OHIO STATE UNIVERSITY
1900 KENNY ROAD • COLUMBUS, OHIO 43210
Telephone: (614) 292-4353 or (800) 848-4815